

WHAT IS CLAIMED IS:

1. A heater module of an apparatus for rapid thermal processing comprising:

5 a heater reactor including a plurality of reflectors at one side thereof, and a plurality of first gas channels for communicating an inner side of the respective reflectors with the other outer side of the heater reactor, respectively;

lamps installed in the respective reflectors;

10 a cooling gas inlet unit installed at the other outer side of the heater reactor, the cooling gas inlet unit having a plurality of first cooling gas inlet openings perforated therethrough to communicate with the respective first gas channels formed at the heater reactor, respectively;

a quartz window installed under the reflectors while being spaced apart from ends of the reflectors to define a second gas channel between the ends of the reflectors and a surface of the window facing the ends of the reflectors;

15 a quartz window fixing unit for fixing the quartz window to the heater reactor; and

a cooling gas outlet unit communicating with the second gas channel.

2. The heater module as set forth in claim 1, wherein the heater reactor is provided therein with water channels of cooling water.

20 3. The heater module as set forth in claim 1, wherein in a state in which the respective reflectors correspond to the respective first cooling gas inlet openings in a one-on-one fashion, the first gas channels are formed in large number at the heater reactor for communicating the inner side of the respective reflectors with the corresponding first cooling gas inlet opening.

25 4. The heater module as set forth in claim 1, wherein each of the first cooling gas inlet openings has a larger inner cross sectional area at a cooling gas outlet end thereof than a cooling gas inlet end thereof for diffusion of inlet cooling gas.

30 5. The heater module as set forth in claim 3, wherein each of the first cooling gas inlet openings has a larger inner cross sectional area at a cooling gas

outlet end thereof than a cooling gas inlet end thereof for diffusion of inlet cooling gas.

5 6. The heater module as set forth in claim 4, wherein the respective first cooling gas inlet opening have a certain region of a dome shape adjacent to the cooling gas inlet end thereof.

7. The heater module as set forth in claim 5, wherein the respective first cooling gas inlet opening have a certain region of a dome shape adjacent to the cooling gas inlet end thereof.

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8. The heater module as set forth in claim 1, wherein the respective reflectors comprise a dome shaped portion, and a side wall inclined to be widened outwardly from an end of the dome shaped portion adjacent thereto, the respective reflectors sharing adjacent side walls with next reflectors located at both sides thereof.

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9. The heater module as set forth in claim 8, wherein the side walls of the reflectors are formed with a horizontal perforating slot, respectively.

10. The heater module as set forth in claim 8, wherein the heater reactor is provided therein with water channels of cooling water for cooling the reflectors, the respective water channels being configured so that a certain region thereof adjacent to the dome shaped portion of the respective reflectors forms a curved portion, and another certain region adjacent to the side wall of the respective reflectors forms inclined portions, which are inclined inwardly toward each other from an end of the curved portion adjacent thereto, thereby allowing the cooling water to flow over a whole portion of the side wall.

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11. The heater module as set forth in claim 9, wherein the heater reactor is provided therein with water channels of cooling water for cooling the reflectors, the respective water channels being configured so that a certain region thereof adjacent to the dome shaped portion of the respective reflectors forms a curved portion, and another certain region adjacent to the side wall of the respective reflectors forms inclined portions, which are inclined inwardly toward each other

from an end of the curved portion adjacent thereto, thereby allowing the cooling water to flow over a whole portion of the side wall.

12. The heater module as set forth in claim 1, wherein the heater reactor comprises:

5 a first reflector section, in which the reflectors are formed in parallel to one another in a transverse direction so that the respective lamps of a stick type are installed in a longitudinal direction;

a second reflector section positioned at an opposite side to the first reflector section in the longitudinal direction; and

10 a third reflector section positioned between the first reflector section and the second reflector section, in the third reflector section, the reflectors being formed in parallel to one another in the longitudinal direction so that the respective stick type lamps are installed in the transverse direction.

13. The heater module as set forth in claim 12, wherein the third reflector section includes at least two third reflector sections provided to face each other in the transverse direction, and

15 wherein the heater reactor further comprises:

a fourth reflector section between the two third reflector sections, in which U-shaped lamps are installed.

20 14. The heater module as set forth in claim 13, wherein the heater reactor is formed with vertical perforating bores in order to install electrodes to be coupled with the respective U-shaped lamps, respectively.

15. The heater module as set forth in claim 1, wherein the heater reactor is further provided with at least one third gas channel for communicating the second gas channel with the other outer side of the heater reactor; and

25 wherein the cooling gas inlet unit is formed with at least one second cooling gas inlet opening to correspond to the third gas channel formed at the heater reactor in a one-on-one fashion.

16. The heater module as set forth in claim 1, wherein the quartz window fixing unit comprises a gas collecting portion communicating with the second gas

channel, and a third cooling gas inlet opening communicating with the second gas channel; and

wherein the cooling gas outlet unit communicates with the gas collecting portion.